Clinton Power Station
8401 Power Road
Clinton, IL 61727

U-604178
May 22, 2014

10 CFR 50.73
SRRS 5A.108

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D. C. 20555-0001

Clinton Power Station, Unit 1
Facility Operating License No. NPF-62
NRC Docket No. 50-461

Subject: Licensee Event Report 2014-002-00

Enclosed is Licensee Event Report (LER) No. 2014-002-00: Lowering Condenser Vacuum due to B Train Steam Jet Air Ejector Instability Results in Manual Reactor Scram. This report is being submitted in accordance with the requirements of 10 CFR 50.73.

There are no regulatory commitments contained in this report.

Should you have any questions concerning this report, please contact Ms. Kathy Ann Baker, Regulatory Assurance Manager, at (217) 937-2800

Respectfully,

B. Keith Taber
Site Vice President
Clinton Power Station

DRA/blf

Enclosure: Licensee Event Report 2014-002-00

cc: Regional Administrator – NRC Region III
NRC Senior Resident Inspector – Clinton Power Station
Office of Nuclear Facility Safety – IEMA Division of Nuclear Safety

IE22
NRR

U-604178

Subject: Licensee Event Report 2014-002-00

bcc: NRC Project Manager, NRR – Clinton Power Station
Institute of Nuclear Power Operations
Manager – Licensing, Clinton Power Station (Cantera)
Director – Licensing and Regulatory Affairs, West (Cantera)
Exelon Document Control Desk Licensing
B. K. Taber
T. R. Stoner
K. A. Baker
C. J. Propst
C. D. Dunn
J. E. Cunningham
T. J. Krawcyk
D. J. Kemper
J. Smith
R. A. Schenck
S. Mischke
S. J. Kowalski
M. D. Heger
C. Small
G. S. Lukach
Maintenance Rule Coordinator, V-130E
Plant Fatigue Coordinator, V-130E
EPIX Coordinator, V-130E
Simulator Coordinator, V-922
TREQ Coordinator, V-922
Nuclear Safety Review Board Coordinator, T-31J
R. W. Chickering, INPO Coordinator (WORD Version)
Licensing Vault Copy (SRRS 5A.108)

NRC FORM 366 (02-2014) U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB: NO. 3150-0104 EXPIRES: 01/31/2017

Estimated burden per response to comply with this mandatory collection request: 80 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the FOIA, Privacy and Information Collections Branch (T-5 F53), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to Infocollects.Resource@nrc.gov, and to the Desk Officer, Office of Information and Regulatory Affairs, NEDB-10202, (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

LICENSEE EVENT REPORT (LER)

(See Page 2 for required number of digits/characters for each block)

1. FACILITY NAME	2. DOCKET NUMBER	3. PAGE
Clinton Power Station, Unit 1	05000461	1 OF 4

4. TITLE

Lowering Condenser Vacuum due to B Train Steam Jet Air Ejector Instability Results in Manual Reactor Scram

5. EVENT DATE			6. LER NUMBER			7. REPORT DATE			8. OTHER FACILITIES INVOLVED	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO.	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
03	25	2014	2014	- 002	- 00	05	22	2014		05000
									FACILITY NAME	DOCKET NUMBER
										05000

9. OPERATING MODE	11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: *(Check all that apply)*			
1	☐ 20.2201(b)	☐ 20.2203(a)(3)(i)	☐ 50.73(a)(2)(i)(C)	☐ 50.73(a)(2)(vii)
	☐ 20.2201(d)	☐ 20.2203(a)(3)(ii)	☐ 50.73(a)(2)(ii)(A)	☐ 50.73(a)(2)(viii)(A)
	☐ 20.2203(a)(1)	☐ 20.2203(a)(4)	☐ 50.73(a)(2)(ii)(B)	☐ 50.73(a)(2)(viii)(B)
	☐ 20.2203(a)(2)(i)	☐ 50.36(c)(1)(i)(A)	☐ 50.73(a)(2)(iii)	☐ 50.73(a)(2)(ix)(A)
10. POWER LEVEL	☐ 20.2203(a)(2)(ii)	☐ 50.36(c)(1)(ii)(A)	☒ 50.73(a)(2)(iv)(A)	☐ 50.73(a)(2)(x)
	☐ 20.2203(a)(2)(iii)	☐ 50.36(c)(2)	☐ 50.73(a)(2)(v)(A)	☐ 73.71(a)(4)
46	☐ 20.2203(a)(2)(iv)	☐ 50.46(a)(3)(ii)	☐ 50.73(a)(2)(v)(B)	☐ 73.71(a)(5)
	☐ 20.2203(a)(2)(v)	☐ 50.73(a)(2)(i)(A)	☐ 50.73(a)(2)(v)(C)	☐ OTHER
	☐ 20.2203(a)(2)(vi)	☐ 50.73(a)(2)(i)(B)	☐ 50.73(a)(2)(v)(D)	Specify in Abstract below or in NRC Form 366A

12. LICENSEE CONTACT FOR THIS LER

LICENSEE CONTACT	TELEPHONE NUMBER *(Include Area Code)*
Jeffrey E. Cunningham, Acting Regulatory Assurance Manager	217-937-3160

13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT

CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANU-FACTURER	REPORTABLE TO EPIX
X	SH	PDC	F130	Y					

14. SUPPLEMENTAL REPORT EXPECTED	15. EXPECTED SUBMISSION DATE	MONTH	DAY	YEAR
☐ YES *(If yes, complete 15. EXPECTED SUBMISSION DATE)* ☒ NO				

ABSTRACT *(Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines)*

On 3/25/14 the plant was in Mode 1, steady state at 85 percent reactor power. Operators in the Main Control Room (MCR) observed Offgas (OG) flow rate lowering, condenser vacuum lowering, and condensate water temperature rising. The 'B' Steam Jet Air Ejector (SJAE) was in service at the time. As condenser vacuum lowered from 29 inches Mercury (Hg) to 27.4 inches Hg, Operators entered the Loss of Vacuum off-normal procedure and commenced a rapid power reduction. While reducing power, the MCR team began preparations to place the 'A' SJAE in service. At 1942 hours with Reactor power at 46 percent and vacuum at 24 inches Hg and lowering, Operators placed the Mode Switch in shutdown. All control rods were fully inserted. The plant responded as expected with no complications. No safety systems actuations occurred nor were required to place the plant in a safe and stable condition. The cause for this event is unstable pressure control of B SJAE due to a system resonance or instability. The root cause of the system resonance is indeterminate at this time pending additional testing. Corrective action for this event includes replacing the SJAE pressure controller and developing a comprehensive test plan that will dampen or eliminate the system resonance.

1. FACILITY NAME	2. DOCKET	6. LER NUMBER			3. PAGE
		YEAR	SEQUENTIAL NUMBER	REV NO.	
Clinton Power Station, Unit 1	05000461	2014	- 002	- 00	2 OF 4

NARRATIVE

PLANT AND SYSTEM IDENTIFICATION

General Electric -- Boiling Water Reactor, 3473 Megawatts Thermal Rated Core Power
Energy Industry Identification System (EIIS) codes are identified in text as [XX].

EVENT IDENTIFICATION

Lowering Condenser Vacuum due to B Train Steam Jet Air Ejector Instability Results in Manual Reactor Scram

A. Plant Operating Conditions Before the Event

Unit: 1 Event Date: 3/25/14 Event Time: 19:42 CDT
Mode: 1 Mode Name: Power Operation Reactor Power: 46 percent

B. DESCRIPTION OF EVENT

On March 25, 2014, at 15:00, Clinton Power Station (CPS) was in Mode 1 (Power Operation) at 85 percent reactor [RCT] power and operators were proceeding with restoring the plant to full power following maintenance outage C1M15.

The B train Steam Jet Air Ejector (SJAE) [EJR], Condenser Vacuum system [SH] was in service, and Operators in the Main Control Room (MCR) observed that Offgas (OG) system [WF] dilution steam flow was lower than desired (92% versus 104%). In response, the MCR performed a heightened level of awareness brief for increasing the dilution flow, which is controlled by air operated valve (AOV) [PDCV] 1B21F435B via pressure controller [PDC] 1B21N544. The system utilizes pressure control downstream of the AOV to set desired flow.

The as-found setting of the pressure controller was 98 pounds per square inch gage (psig) (the controller input range is 30 inches mercury (Hg) to 300 psig).

At 16:30, an initial adjustment was made to 99 psig with no changes noted.

At 16:45, a second adjustment was made to 100 psig with minimal change noted.

At 17:00, a third adjustment was made from 100 psig to 101 psig.

Following the third adjustment the pressure began oscillating between 70 and 110 psig. Operators restored the controller setpoint to the as-found setpoint of 98 psig at 17:20 and the oscillations reduced slightly (30 pounds per square inch swings) and remained constant. At this time Operators decided to leave the work site and monitor the dilution flow on an hourly basis.

At 18:42, as condenser vacuum lowered from 29 inches Hg to 27.4 inches Hg Operators entered the off-normal procedure for Loss of Vacuum.

NARRATIVE

At 19:39, Operations initiated a rapid plant shutdown due to main condenser vacuum being 24 inches Hg and lowering. While reducing power, the MCR dispatched operators to begin preparations for placing the A SJAE in service. The initiator of the vacuum reduction was unstable pressure control of the 'B' train SJAE.

At 19:42, with the plant at 46 percent reactor power, Operators initiated a manual reactor Scram by placing the reactor mode switch [HS] in the Shutdown position.

C. CAUSE OF EVENT

The cause of the event has been determined to be unstable pressure control of 'B' SJAE. The most probable cause of unstable pressure control is a system resonance or instability in the 'B' SJAE system that has caused the station to be unsuccessful in tuning the 1B21N544 controller. The root cause of the system resonance is indeterminate at this time pending additional testing.

D. SAFETY CONSEQUENCES

This event had no actual nuclear safety consequences. Operators appropriately responded to lowering condenser vacuum by initiating a manual reactor Scram prior to the automatic Scram as directed by procedure. All control rods fully inserted in response to the manual reactor Scram and no Engineered Safety Feature (ESF) actuations occurred or were required. No safety/relief valve(s) lifted and all systems responded as expected in response to the Scram.

There was no unusual plant response and no complications resulting from the Scram.

The affected steam jet air ejector equipment is non-safety related. No loss of safety function occurred during this event.

E. CORRECTIVE ACTIONS

Corrective actions include replacement of the original controller with a new model featuring a manual mode of operation, and development of a comprehensive test plan that will isolate the instability region and create a final solution to dampen or eliminate the system resonance.

F. PREVIOUS OCCURRENCES

There have been previous issues at CPS related to the equipment problems (SJAE instability). The License Event Reports 1991-006 and 1993-007 from Clinton Power Station were associated with Steam Jet Air Ejector and Reactor Scrams.

1. FACILITY NAME	2. DOCKET	6. LER NUMBER			3. PAGE
		YEAR	SEQUENTIAL NUMBER	REV NO.	
Clinton Power Station, Unit 1	05000461	2014	- 002	- 00	4 OF 4

NARRATIVE

G. COMPONENT FAILURE DATA

Component Description: SJAE 1B Second Stage Main Steam Inlet Pressure Controller
Manufacturer: Fisher Controls
Model: 4160K